INFO SHEET

Veterinary Services

APHIS

United States Department of Agriculture

Animal and Plant Health Inspection Service

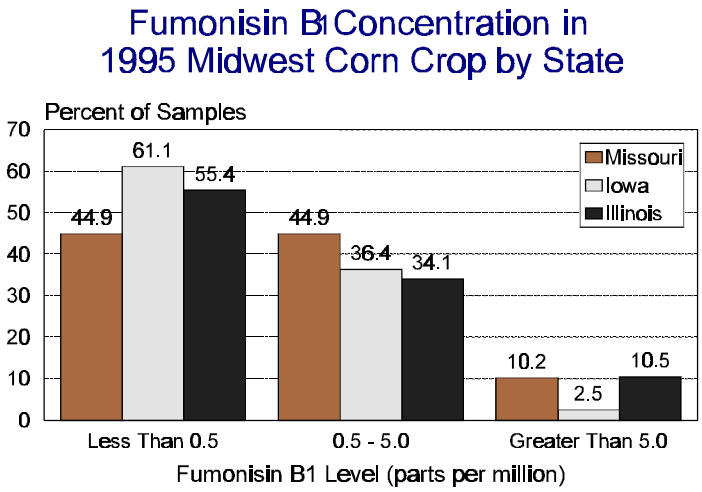
Mycotoxin Levels in the 1995 Midwest Preharvest Corn Crop

Mycotoxins are compounds produced by corn ear rots (molds) under widely varying conditions relating to weather or insect damage. Improper storage can encourage further development and is usually the cause of levels toxic to animals. Monitoring mycotoxin levels in corn crops will enable the USDA to detect significant levels in crops prior to feed storage and alert farmers to take steps necessary to prevent additional problems.

In the fall of 1995, the USDA collected preharvest corn samples in a total of 639 fields selected across Missouri, Iowa, and Illinois. These three states represented approximately 45 percent of the U.S. corn crop. Fields were selected using random sampling procedures designed to assure that each acre of corn in the states had an equal chance of being selected. Just prior to harvest, a four-ear sample was taken from each field and analyzed for six mycotoxins: fumonisins B_1, B_2, and B_3 (FB_1, FB_2, FB_3); vomitoxin; zearalenone; and aflatoxin B_1.

Fumonisins were the most frequently detected mycotoxins. The equine species is the most susceptible animal group to the fumonisin mycotoxins (liver and brain damage.) The American Association of Veterinary Laboratory Diagnosticians Mycotoxin Committee recommends that equine rations contain less than 5 ppm FB_1, swine less than 10 ppm, and beef cattle less than 50 ppm.

Figure 1



USDA:APHIS:VS, #3020.

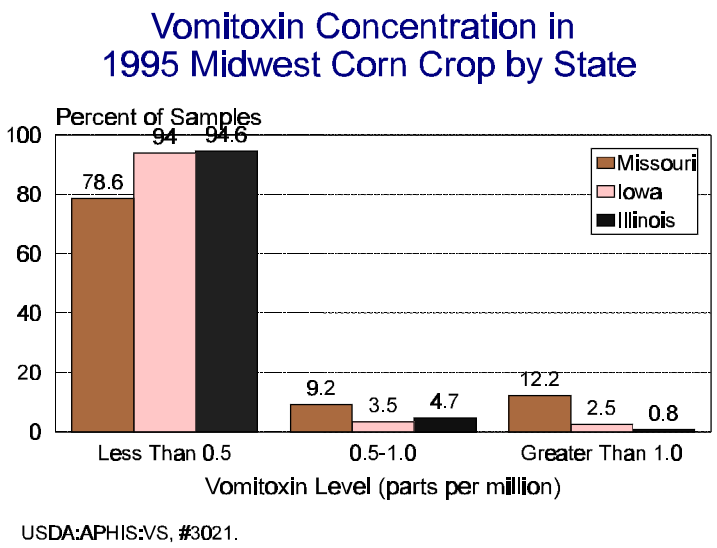
Of the total samples from all three states, 6.9 percent contained FB_1 concentrations greater than 5.0 parts per million (ppm). Figure 1 shows the FB_1 concentrations by state. Missouri, Iowa, and Illinois percentages of samples exceeding 5.0 ppm were 10.2 percent, 2.5 percent, and 10.5 percent respectively. The average FB_1 concentration was 2.2 ppm in samples from Missouri, 0.8 ppm for Iowa, and 1.6 ppm for Illinois.

Samples that contained FB_1 also contained lower concentrations of FB_2 and FB_3, a trend

consistent with previous studies. The highest concentration of FB_1 was 24.0 ppm in a sample from Missouri. High concentrations of FB_1 for Illinois and Iowa were 21.8 and 17.6 respectively.

Vomitoxin, also called deoxynivalenol, was frequently detected at concentrations generally well below a level of concern. Levels above 2 parts per million (ppm) have been associated with reduced feed intake in swine with more severe problems at levels of 5 ppm or higher. Figure 2 shows that there were few samples with concentrations of concern. For all three states, only 3.3 percent of the samples were above 1 ppm.

Figure 2



USDA:APHIS:VS, #3021.

While a *zearalenone* level as low as 1 ppm could cause health problems in swine, the compound was detected in one sample collected for this study at a level of 2 ppm. Levels of more than 10 ppm would be necessary to cause problems in cattle.

Only one sample in this study contained *aflatoxin* B_1 above 20 parts per billion (ppb), the limit regulated by the Food and Drug Administration. The sample tested at 52 ppb. It would take a level of 50 ppb to cause milk residues in cattle, and there are no severe effects on swine and poultry until concentrations rise above 200 ppb.

Collaborators in the study were the National Veterinary Services Laboratories (NVSL); the National Agricultural Statistics Service (NASS); and the Animal and Plant Health Inspection Service's National Animal Health Monitoring System (NAHMS). These USDA programs have also collaborated on the NAHMS Swine '95:Grower/Finisher study to collect and analyze stored feed samples to evaluate mycotoxin levels being fed to swine.

Mycotoxin testing is available for individual operations. For more information on testing or results of this preharvest study, contact:

The National Veterinary Services Laboratories
USDA, APHIS
13th Street and Dayton Road
Ames, Iowa 50010.

N195.1295